

cial, Mr. J. J. Beringer, in reviewing the growth of the school for the past ten years, made some remarks upon the recent report of the departmental committee on the Royal College of Science. He pointed out that while the fellows of the faculty of mining and metallurgy may be only capable of being produced and fully nourished to maturity in the new institution, yet the general practitioners would still find their way to Camborne for their training. The chairman of the school committee, Mr. C. V. Thomas, remarked that though encouragement was given by the Government and the County Council, sufficient material assistance had always been wanting, and plans for extensions were crippled for want of funds.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, December 7, 1905.—“A Biometrical Study of Conjugation in *Paramæcium*.” By Dr. Raymond **Pearl**. Communicated by Prof. Karl Pearson, F.R.S.

The purpose of this investigation was to determine whether any sensible differentiation exists between the conjugating and non-conjugating members of a population of the common ciliate infusorian *Paramæcium caudatum*, and to what degree structurally similar individuals tend to pair together in conjugation. The characters principally studied were length and greatest breadth of the body, and the shape of the organism as measured by the length-breadth index. The material used covered a considerable range of cultural conditions. It was found that there is a very considerable differentiation between conjugant and non-conjugant individuals. In respect to the absolute size characters (length and breadth of body), the differences between the means for the two groups of individuals amounted to from 10 per cent. to 20 per cent. of the mean size of the larger (non-conjugant) individuals. Not only are conjugants absolutely smaller than non-conjugants, but they are also sensibly differentiated in shape. Further, they are much less variable, and less highly correlated. There is a strongly marked tendency for like to pair with like in the conjugation of *Paramæcium*. The coefficients of correlation measuring homogamy in conjugation, are relatively very high, both for direct and cross assortative pairing, in all the characters examined. By an experimental study of random pairings it was shown that this homogamy in conjugation is due to a real assorting and pairing of like with like, and not a spurious effect of local differentiation in the culture. Further, by comparing records obtained from recently united pairs of conjugants with similar records from pairs about to separate, it was shown that the results cannot be due to any process of equalisation in size during the process of conjugation itself. The probable manner in which the homogamic pairing is brought about is discussed, and it is shown that the results are easily explicable on the basis of known facts regarding the behaviour of the organism. It is pointed out that the demonstration of the existence of a relatively fixed “conjugant type” has a direct bearing on current views as to the theoretical significance of protozoan methods of reproduction. The importance of getting positive evidence that a sensible degree of homogamy actually exists among organisms living under natural conditions has been many times emphasised by writers on evolution. The present work brings forward such evidence for a single organism standing low in the scale of organisation.

January 18.—“A Case of Regeneration in Polychæte Worms.” By Arnold T. **Watson**. Communicated by Prof. C. S. Sherrington, F.R.S.

January 25.—“On the Overstraining of Iron by Tension and Compression.” By Dr. James **Muir**. Communicated by Prof. A. Gray, F.R.S.

The behaviour of mild steel under compression is investigated. Compression stress-strain curves are usually shown very much rounded at the yield-point. In this paper a specimen of steel is shown to have obeyed Hooke's law until abrupt permanent shortening occurred at the stress of $21\frac{1}{2}$ tons per square inch. At this stress the reading on a Ewing “compression extensometer” altered from 241 to

2900 without increase of load. This permanent shortening at the compression yield-point was found to be practically equal to the extension at the tension yield-point of the same material. A second compression test made on the same specimen, after recovery from the compressional overstrain, showed that the compression yield-point had been raised by a step of 4 tons per square inch. This was approximately the step by which the tension yield-point of the material could be raised by tensile overstrain.

Experiments were further made to investigate the behaviour under compression of steel which had previously been subjected to tensile overstrain. The experiments seem to indicate that there are two distinct causes contributing to the phenomenon of hardening by tensile overstrain:—(1) the overstraining itself—the actual stretching of the material—seems to harden the material equally as regards both resistance to tension and to compression; while (2) the process of recovery from tensile overstrain, which seems to bring into existence an internal stress, raises the tension yield-point by a definite step above the overstraining stress, but seems to lower the compression yield-point by approximately an equal amount below the overstraining stress. For example, a specimen subjected to a series of tension tests in which the loading is carried just beyond the yield-point (recovery from overstrain being effected between each test) might exhibit yield-points at 20, 25, 30, 35, and 40 tons per square inch. The corresponding compression yield-points should probably occur at about 20, 15, 20, 25, and 30 tons per square inch. This conjecture can scarcely be said to have been fully established, further research being necessary; but it is shown that steel may be hardened by tensile overstrain to resist higher stresses both in tension and in compression, although material so hardened always withstands a greater stress in tension than in compression.

February 8.—“Polarisation in Secondary Röntgen Radiation.” By Dr. C. G. **Barkla**. Communicated by Prof. J. J. Thomson, F.R.S.

In a previous paper the author gave an account of experiments which demonstrated the partial polarisation of a beam of X-rays proceeding from the anti-kathode of an X-ray focus tube. The secondary radiation from substances of low atomic weight placed in the primary beam, however, varied in intensity in the two principal directions by not more than about 20 per cent.

The experiments described in this paper were made on the secondary radiation proceeding from a substance of low atomic weight, for, according to the theory given, the radiation proceeding in a direction perpendicular to that of propagation of the primary should be almost completely polarised.

The method was similar to that used in previous experiments, the intensity of tertiary radiation from a light substance placed in the secondary beam being studied by means of electroscopes, shielded from the direct primary and secondary radiations.

The principal experimental difficulties were due to the weakness of the tertiary beams.

Carbon was chosen as the radiating substance because the energy of secondary radiation from substances of low atomic weight had been found to be proportional merely to the quantity of matter passed through by a primary of given intensity, and as absorption diminishes with the atomic weight, the lower the atomic weight the greater is the energy of secondary radiation proceeding from thick plates exposed to a given primary.

A large mass of carbon was placed in the primary beam, and the horizontal secondary beam proceeding from this in a direction perpendicular to that of propagation of the primary was studied. In it was placed a second mass of carbon, and two electroscopes were situated to receive tertiary rays proceeding in horizontal and vertical directions. As the X-ray tube was turned round the axis of the secondary beam, the intensities of tertiary radiation in the two directions changed, one increasing to a maximum while the other decreased to a minimum.

It was found that the horizontal tertiary reached a maximum and the vertical a minimum when the primary beam was horizontal, and that the conditions were reversed when the primary was turned through a right-angle.

This result was anticipated by the theory previously given, and may be explained by considering the electrons in the radiating substance to be accelerated in the direction of electric displacement in the pulses passing over them.

The intensities in the two principal directions were approximately in the ratio 3 : 1. Considering the obliquity of primary, secondary, and tertiary rays in the beams experimented upon, this result indicates fairly complete polarisation in a narrow pencil of secondary radiation proceeding from the substance in a direction perpendicular to that of propagation of the primary.

When iron was used as the radiator in the secondary beam, though the rates of deflection of the electroscopes were of the same order of magnitude as before, there was no appreciable variation as the direction of the primary beam was changed.

This result was what previous experiments on iron led one to expect, and was the most conclusive proof of the interpretation of the results obtained with carbon. The independence of motion of the electrons disappears in the heavier atoms, and each is subject to considerable forces not directly due to the primary pulse (in this case the secondary pulse) and not in the direction of electric displacement in this pulse. Hence the variation in intensity of the tertiary in different directions becomes inappreciable, while the pulse thickness in the tertiary beam becomes greater than in the secondary, and is consequently more readily absorbed.

Geological Society, February 16.—Annual General meeting.—Dr. J. E. Marr, F.R.S., president, in the chair.—Influence of the geological structure of English Lakeland upon its present features. Anniversary address: **President**. After an account of the light thrown upon the structure of Lakeland by the writings of other geologists, the president considered his subject under the following heads:—Events prior to the uplift which produced the dome; production of the dome; initiation of the drainage-lines; effects of the three types of rocks upon the scenery; modification of old drainage-lines; depression of the outskirts; effects of meteorological conditions, (1) general, (2) the Glacial period. Of the events prior to the dome-shaped uplift, he laid greatest stress upon the movements of Devonian times, which had caused the Lower Palæozoic rocks to be affected by fractures forming a roughly rhomboidal network, the fissures being marked by belts of broken rock along their courses. He accepted Hopkins's view of the formation of a dome comparable in shape to a "caddy-spoon" with the short handle to the east. He gave further reasons in support of the view that the uplift of the dome and the final movements of the Pennine Chain were of Tertiary date. After commenting on the theory that rocks of New Red Sandstone age extended over the district, he discussed the nature of the radial drainage impressed upon these newer rocks during the uplift of the dome, and the removal of these rocks in the district itself by denudation, producing a superimposed drainage on the Lower Palæozoic rocks. The changes which took place in the valleys as the result of the imposition of the rivers upon the ancient rocks were then discussed, and it was maintained that diversion of the river-courses had largely taken place owing to the easier erosion along the shatter-belts. When discussing the effects of meteorological conditions he commented on hill-outlines, where the upper parts of hill-slopes presented a convex outline towards west and south, and a concave curve towards east and north. This he attempted to explain as due to the more profuse growth of vegetation on the slopes facing west and south.

February 21.—Sir Archibald Geikie, Sec.R.S., president, in the chair.—The constitution of the interior of the earth, as revealed by earthquakes: R. D. Oldham. This paper sets forth the information to be obtained from the records of distant earthquakes. The record of a great earthquake exhibits three phases, of which the third represents wave-motion travelling along the surface of the earth, and can give no information regarding the interior. The other two phases form the preliminary tremors, and represent the emergence of two forms of wave-motion propagated through the earth. Up to a distance of 120° of arc from the origin,

these waves are propagated at a rate which increases with the depth of the wave-path, and reaches an average of more than 10 km. sec. for the first-phase, and more than 6 km. sec. for the second-phase waves. The increase may be attributed to the effect of increased pressure and temperature. Beyond this limit the first-phase waves show a reduction in the mean rate of transmission, while the second-phase waves are found, not where they would be expected, but at about $11'$ later. Two interpretations are given. Either alternative leads to the conclusion that, after the outermost crust of the earth is passed, there is no indication of any rapid change of physical and chemical properties until a depth of about six-tenths of the radius is reached.—The Tarannon series of Tarannon: Dr. Ethel M. R. Wood. The Tarannon strata are well developed in the Llanbryn-mair-Tarannon district, and the present paper gives the results of a detailed survey of the entire Tarannon series as there exhibited. Lists of the contained graptolites are given, and the species are paralleled with those from the corresponding beds of the south of Scotland, the Lake District, North Wales, central Wales, and Sweden, demonstrating the similarity of the graptolitic succession in all these districts. The Tarannon series in this district has a maximum thickness of 3500 feet, but thins somewhat as it is traced north-westward. It rests conformably on Llandovery rocks below, and passes up without a break into Wenlock beds above. This rock-series is stratigraphically continuous from base to summit. The strata of the overlying Wenlock series present all the characters of the Denbigh Grits and Flags of North Wales. The Llandovery series, which underlies the Tarannon series, has, at present, been recognised only in the western part of the district, namely, in the valley of the Twymyn, and its rocks are brought to the surface by an anticlinal fold. A comparison of the graptolitic lists shows that the Tarannon series, as here defined, corresponds almost exactly with the Gala or Queensberry group of the south of Scotland, includes all the palæontological zones hitherto assigned to the Tarannon, and fills up the whole period intervening between the Llandovery below and the Wenlock above.

Physical Society, February 23.—Prof. J. Perry, F.R.S., president, in the chair.—A note on Talbot's lines: J. Walker. The diffraction-pattern of a line of monochromatic light seen in focus, due to a rectangular aperture with its sides parallel to the line, is characterised by dark bands arranged at equal intervals on either side of the geometrical image of the line. The effect of covering half the aperture with a retarding plate is to displace the bands of an odd order towards the covered side by an amount proportional to the retardation introduced, those of an even order remaining fixed. Suppose that the light is white and that its monochromatic constituents have been made by spectral analysis to occupy different angular positions in the field. Owing to the dispersion, the bands of an even order are obliterated; but in the case of those of an odd order the dispersing power of the plate itself produces a dispersion of the bands, and consequently these bands will be seen, provided the plate have a suitable thickness and be so placed that the dispersion of the bands produced by it acts in opposition to the primitive dispersion of the light.—Secondary Röntgen radiation: Dr. C. G. Barkla. In previous papers the author has shown that the secondary X-rays from certain gases and light solids subject to Röntgen radiation may be fully explained by considering the corpuscles or electrons constituting the atoms to be accelerated in the direction of electric displacement in each primary Röntgen pulse as it passes through such substances, and that the interaction between the electrons affects only to a slight extent the character of the secondary radiation. Experiments on the absorption of rays proceeding from thick plates of a large number of elements showed that beyond the region of atomic weights in which the character of the secondary radiation is almost independent of the nature of the radiation, the absorbability is a periodic function of the atomic weight of the radiator, and that, so far as these experiments have gone, different periods are represented by curves of similar form. The theory which has been found to explain all the pheno-

mena of secondary radiation from light atoms may be extended to explain these results, if the independence of motion of the electrons is conceived to disappear with an increase in the number of electrons in the atom.—Records of the difference of potential between railway lines when a train passes and at other times, and a suggested method for the observation of earth currents and magnetic variations: C. W. S. **Crawley** and F. B. O. **Hawes**. The experiments described in the paper were made on the London and South-Western main line, between Walton and Weybridge stations. To each rail of the up line a wire was permanently attached, and the other ends of the wires were connected to the terminals of a reflecting galvanometer. The deflections of the galvanometer were recorded on a moving sheet of paper, and curves obtained showing the variation in the current through the galvanometer. The curves showed a concordance in the results from successive trains. The normal current through the galvanometer began to be disturbed about one minute before the passage of a train, and the disturbance lasted about two minutes.

Royal Microscopical Society, February 21.—Dr. Dukinfield H. Scott, F.R.S., president, in the chair.—A method of producing stereo-photomicrographs: W. P. **Dollman**. A number of good stereoscopic prints were exhibited in the room in illustration of the paper.—A simple method of taking stereo-photomicrographs and of mounting the prints without cutting: Mr. **Taverner**. Though this paper was upon the same subject as the previous one, the methods of the authors were different, and Mr. Dollman limits his operations to very low powers, giving amplifications of 9 to 20 diameters only. He uses a stop in front of the objective, and exposes first one side of the lens and then the other as he takes his two stereoscopic pictures. Mr. Taverner uses higher powers, and a peculiar stop at the back of the objective. The authors adopt a similar arrangement for obviating the necessity of cutting the prints.—A second list of rotifers of Natal: Hon. T. **Kirkman**. The author described a remarkable new species, *Copeus triangulatus*.

Anthropological Institute, February 27.—Prof. W. Gowland, president, in the chair.—Ancestor worship in Japan: W. G. **Aston**. It was shown that the so-called ancestor worship of the Japanese is in reality a cult of the sun and other nature deities, but as the sun or sun-goddess, by a genealogy which covers a period of about 2,000,000 years and contains many miraculous incidents, is feigned to be the ancestor of the Mikados, the Japanese naturally speak of this cult as ancestor worship. We should not follow their example. The descent of the Japanese nobility from the sun-goddess and other deities of the old Pantheon is to be regarded in the same light. There is a worship of true ancestors in Japan, but it is due to Chinese influence, and is of later origin.—Anthropological notes from Lake Tanganyika: W. A. **Cunnington**. The author dealt with the manners, customs, and arts, &c., of the natives living by the lake. Among the slides exhibited was a series showing the different stages of the manufacture of a pot, the peculiar point being that the bottom of the pot is put in last. Other slides showed examples of weapons, dress, houses, and costumes of the natives.

March 13.—Prof. W. Gowland in the chair.—A collection of Palæolithic implements from the neighbourhood of Southampton: W. **Dale**. The author divided the implements into the following groups:—flakes, plain and trimmed; implements with the butt end purposely left smooth, used for chopping; oval- and almond-shaped implements with a cutting edge all round; pointed implements with both edges equal, and tapering gradually; pointed implements with one curved and one straight edge, adapted for making long cutting strokes; pointed implements in which one side has been left as flat as possible—these occur very sparingly in the Hants gravels.—Materials for a study of tatu in Borneo: R. **Sheiford** and Dr. C. **Hose**. The paper contained the observations made by the writers amongst the Kayans, Kenyahs, Bakatans, Kalabits, and Sea-Dayaks of Sarawak. All the information on the subject by previous writers had been analysed

and compared, special use being made of Dr. A. Nieuwenhuis's books on Borneo. Kayan tatu, which is still a flourishing art, was described in considerable detail, not only with reference to the tatu designs employed, but also to the elaborate ceremonial accompanying the practice. The Kenyahs and Sea-Dayaks also appear to have borrowed the practice of tatu very largely from the Kayans; but most of the Indonesian tribes have all had at one time or another a distinctive tatu. It is most unfortunate that the practice is rapidly dying out amongst these people. It was not found possible to classify the tattooed peoples of Borneo in three main divisions as had been done by Dr. Nieuwenhuis for those of a less extended area.

Linnean Society, March 1.—Prof. W. A. Herdman, F.R.S., president, in the chair.—A new type of stem from the Coal-measures: Dr. D. H. **Scott**. The stem is one of the many interesting fossils obtained from the pit at Shore-Littleborough, in Lancashire, opened up for scientific purposes by the generosity of the owner, Mr. W. H. Sutcliffe. The sections were cut by Mr. J. Lomax. The specimen was derived from one of the roof-nodules, which generally represent a peculiar flora, distinct from that of the seam-nodules immediately below. Specimens of the great petioles of the same plant had been discovered a year or two before the stem itself came to light. The fragment was about 15 cm. long, and belonged to a stem of considerable size, the diameter being about 12×6.5 cm. The new stem is referred to the family Medulloseæ, of which it constitutes a unique type. It is placed in a new genus, named Sutcliffia, in honour of Mr. Sutcliffe, of Shore-Littleborough, and the specific name *S. insignis* is proposed for it.—Notes on some species of Nereis in the district of the Thames estuary: Dr. H. C. **Sorby**. In the course of yachting expeditions during successive summers for more than twenty years, Dr. Sorby has observed some remarkable facts connected with the Heteronereis form in two species of Nereis. The rarity of the occurrences should make the record of them acceptable. Notes are given in the paper on five species of Nereis found in the Thames district.

Sociological Society, March 14.—Prof. E. Ray Lankester, F.R.S., in the chair.—Notes on the sociological appeal to biology for suggestion: Prof. J. A. **Thomson**. The sociologist is beginning to recognise the usefulness of analysing out the organic processes which contribute to the result which we call social activity. The same is true of the sociologist's appeal to biology. If the recognition of biological factors operative in social activity is very partial the result is sure to be fallacious. By recognising the operation of biological factors in the life of a society group the sociologist brings what is distinctively social into greater prominence. There is some danger of an inaccurate "materialism" if we pretend that sociology is merely a higher department of biology. The chief value of the appeal to biology by sociological students is threefold:—(a) aiding in analysis; (b) showing that various modes of social activity have a biological aspect; (c) suggesting from biological experience the discovery of sociological laws.

PARIS.

Academy of Sciences, March 12.—M. H. Poincaré in the chair.—The propagation of a movement round a centre in an elastic, homogeneous, and isotropic medium: J. **Boussinesq**.—The effects of the absorption of tuberculin by the digestive tube in healthy and tuberculous animals: A. **Calmette** and M. **Breton**. The experiments described show that tuberculin, when absorbed by the alimentary canal, is toxic for non-tuberculous animals, the effect being especially marked for young animals. The tuberculin is no better tolerated when the dosage starts from a minimum and is progressively increased. For tuberculous animals a very much smaller dose of tuberculin is poisonous.—The evolution of the Tertiary mammals: the importance of migrations: Charles **Depéret**.—The seventh scientific voyage of the *Princess Alice*: **Prince Albert of Monaco**. General description of the work done in oceanography, zoology, microbiology, and meteorology of the Sargasso Sea, in mid-Atlantic.—Observations of the comet 1906b

made with the large equatorial of the Observatory of Bordeaux: E. **Esclangon**. The observations were made on March 6 and 7. The comet had the appearance of a star of 10.5 magnitude, surrounded by a very feeble luminosity.—The electromotive forces of contact between metals and liquids, and an improvement in the ionograph: Charles **Nordmann**. Diagrams are given of the apparatus and of a record of the recording instrument for a period of twelve hours.—The sympathetic vibration of a string giving a low note under the influence of one giving a higher note, and the possible consequences arising from this: Edmond **Bailly**. It has been held up to now that a note cannot produce a sympathetic vibration in a string of lower pitch than itself. The author describes an experiment leading to a contrary conclusion.—The action of hot sulphuric acid on salts of platinum and iridium in the presence of sulphate of ammonium: Marcel **Delépine**. Both these metals are dissolved by boiling sulphuric acid in very appreciable quantities. Complex acids appear to be formed in which the sulphuric acid is not precipitable by barium chloride.—The action of peroxide of nitrogen on ammonia and some ammoniacal salts: MM. **Besson** and **Rosset**. When liquid ammonia at -90° C. is added to solid nitrogen peroxide at the same temperature there is a violent explosion. The reaction can be moderated by working with ammonia gas at -20° C.; the products are nitrogen, nitric oxide, and ammonium nitrate.—The action of silicon chloride upon cobalt: Ém. **Vigouroux**. At a high temperature silicon chloride is reduced by cobalt, a volatile metallic chloride being formed and a cobaltosilicon remaining behind. The amount of silicon in this latter compound tends to the silicide Co_2Si as a limit.—The dilactide of lævorotatory lactic acid: E. **Jungfleisch** and M. **Godchot**.—A method of determination of the foreign materials contained in cocoa and chocolate: F. **Bordas** and M. **Touplain**. The substance is treated with carbon tetrachloride mixed with varying proportions of benzene, so as to get a range of density between 1.6 and 1.346. A separation of the materials of different densities is readily effected.—Polyvalent antioxydase serum: C. **Gessar**.—Contribution to the systematic anatomy of some kinds of ferns: Ferdinand **Pelourde**.—Nuclear fertilisation in the Mucorineæ: M. **Dangeard**.—*Hylchoerus Meinertzhageni*: Maurice **de Rothschild** and Henri **Neuville**.—The structure of the cæcum or filiform appendices of the middle intestine of *Phyllium crurifolium*: L. **Bordas**.—The comparative anatomy of the Sipunculidæ: Marcel A. **Hérubel**.—The evolution of the supposed coccidia of cephalopods: Th. **Moroff**.—A new disease of the trout: L. **Léger**.—The analysis of tubercle bacilli: G. **Baudran**. Separate analyses were made of dead and living bacilli. The former gave lecithin, cholesterin, and fat, cellulose, nuclein, and albumenoid materials. The living bacilli gave, in addition, an anaëroxydase and an alkaloid.—The reaction of the blood a function of nutrition: Jean **Gautrelet**. There is an absolute parallelism between the apparent alkalinity of the blood and the activity of the organic exchanges as measured by the amount of hæmoglobin.—The Pleistocene glaciers in the valleys of Andorre: Marcel **Chevalier**.—The volcanoes of the Livradois and Comté, Puy-de-Dôme: Ph. **Glangeaud**.—The tectonic of the Ivée and Strona zones: Émile **Argand**.—The diatom-bearing sediments of the region of Lake Tchad: Paul **Petit** and H. **Courtet**.

DIARY OF SOCIETIES.

THURSDAY, MARCH 22.

ROYAL SOCIETY, at 4.30.—*Bakerian Lecture*: Recent Advances in Seismology: Prof. J. Milne, F.R.S.—On Methods whereby the Radiation of Electric Waves may be mainly confined to Certain Directions, and whereby the Receptivity of a Receiver may be restricted to Electric Waves emanating from Certain Directions: Chevalier G. Marconi.—A Note on the Theory of Directive Antennæ or Unsymmetrical Hertzian Oscillators: Prof. J. A. Fleming, F.R.S.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Electrical Equipment of the Aberdeen Collieries of the Powell Duffryn Co.: C. P. Sparks.—Electric Winding considered Practically and Commercially: W. C. Mountain.

ROYAL INSTITUTION, at 5.—Internal Combustion Engines: Prof. B. Hopkinson.

FRIDAY, MARCH 23.

ROYAL INSTITUTION, at 9.—Imperial Defence: Lord Roberts.

PHYSICAL SOCIETY (University College), at 5.—On Unilateral Electric Conductivity over Damp Surfaces: Prof. F. T. Trouton, F.R.S.—The

Construction and Use of Oscillation Valves for Rectifying High Frequency Electric Currents: Prof. J. A. Fleming, F.R.S.—On the Use of the Cymometer for the Determination of Resonance Curves: G. B. Dyke.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Waves: F. K. Stevens.

SATURDAY, MARCH 24.

ROYAL INSTITUTION, at 3.—The Corpuscular Theory of Matter: Prof. J. J. Thomson, F.R.S.

MONDAY, MARCH 26.

SOCIETY OF ARTS, at 8.—Fire, Fire Risks, and Fire Extinction: Prof. Vivian B. Lewes.

INSTITUTE OF ACTUARIES, at 5.—Some Aspects of Registration of Title to Land: J. R. Hart.

TUESDAY, MARCH 27.

ROYAL INSTITUTION, at 5.—The Influence of Geology on Scenery: Dr. J. E. Mart, F.R.S.

INSTITUTION OF CIVIL ENGINEERS, at 8.—*Continued Discussion*: The Outer Barrier, Hobbartow Iron Mines: H. Shelford Bidwell.—The Harbours of South Africa: C. W. Methven.

WEDNESDAY, MARCH 28.

SOCIETY OF ARTS, at 8.—Coal Conservation, Power Transmission and Smoke Prevention: A. J. Martin.

THURSDAY, MARCH 29.

ROYAL SOCIETY, at 4.30.—*Probable Papers*: On the Dilatational Stability of the Earth: Lord Rayleigh, O.M., P.R.S. On the Observations of Stars made in some British Stone Circles. Second Note: Sir J. Norman Lockyer, K.C.B., F.R.S.

ROYAL INSTITUTION, at 5.—Internal Combustion Engines: Prof. B. Hopkinson.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—*Adjourned Discussion*: Electrical Equipment of the Aberdeen Collieries of the Powell Duffryn Company: C. P. Sparks.—Electric Winding, considered Practically and Commercially: W. C. Mountain.

FRIDAY, MARCH 30.

ROYAL INSTITUTION, at 9.—Recent Progress in Magneto-optics: Prof. P. Zeeman.

SATURDAY, MARCH 31.

ROYAL INSTITUTION, at 3.—The Corpuscular Theory of Matter: Prof. J. J. Thomson, F.R.S.

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